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Attorney Docket No.: 16869S-111200US
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

HIROFUMI NAGASUKA *et al.*

Application No.: 10/804,942

Filed: May 18, 2004

For: STORAGE MANAGEMENT METHOD

Customer No.: 20350

Examiner: Unassigned

Technology Center/Art Unit: 2186

Confirmation No.: 8073

RENEWED PETITION TO MAKE SPECIAL FOR NEW APPLICATION UNDER M.P.E.P. § 708.02, VIII & 37 C.F.R. § 1.102(d)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Decision dated May 4, 2005 dismissing the original petition to make special, Applicants respectfully submit a renewed petition to make special the above-identified application under MPEP § 708.02, VIII & 37 C.F.R. § 1.102(d). The application has not received any examination by an Examiner.

(a)   The Commissioner has previously been authorized to charge the petition fee of $130 under 37 C.F.R. § 1.17(i) and any other fees associated with this paper to Deposit Account 20-1430.

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(b)   All the claims are believed to be directed to a single invention. If the Office determines that all the claims presented are not obviously directed to a single invention, then Applicants will make an election without traverse as a prerequisite to the grant of special status.

(c)   Pre-examination searches were made of U.S. issued patents, including a classification search, a computer database search, and a keyword search. The searches were performed on or around January 14, 2005, and were conducted by a professional search firm, Kramer & Amado, P.C. The classification search covered Class 711 (subclasses 162, 207, and 209) for the U.S. and foreign subclasses identified above. The computer database search was conducted on the USPTO systems EAST and WEST. The keyword search was conducted in Class 711 (subclasses 111, 148, 151, and 159). The inventors further provided a reference considered most closely related to the subject matter of the present application (see reference #4 below), which was cited in the Information Disclosure Statements filed on March 18, 2004.

(d)   The following references, copies of which were previously submitted, are deemed most closely related to the subject matter encompassed by the claims:

    (1)   U.S. Patent No. 4,843,543;

    (2)   U.S. Patent No. 6,529,944 B1;

    (3)   U.S. Patent No. 4,985,828; and

    (4)   Japanese Patent Publication No. JP 2002-132552.

(e)   Set forth below is a detailed discussion of references which points out with particularity how the claimed subject matter is distinguishable over the references.

A.   Claimed Embodiments of the Present Invention

The claimed embodiments relate to a storage device management method in a computer system, a computer system, a storage device, and a management computer, particularly, to a method for managing a storage device in a computer system capable of effectively grasping the storage device use state and the file allocation information.

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Independent claim 1 recites a storage management method for a computer system including a host computer, a storage sub-system having one or more volumes, a disk control unit provided in the storage sub-system for controlling operation of the storage sub-system, and a management computer for managing configuration of the storage sub-system. The method comprises registering, by the host computer, a volume identifier, a physical address, and a group identifier of the storage sub-system in a disk management table in the disk control units as a result of grouping of volumes in the storage sub-system according to a use purpose; obtaining, by the disk control unit, a physical address of a volume belonging to a same group as a group identifier input from the management computer from the disk management table, and notifying information described in a volume list of a volume allocated at the physical address to the management computer; and displaying, by the management computer, the information thus notified.

Independent claim 2 recites a storage management method for a computer system including a host computer, a storage sub-system having one or more volumes, a disk control unit provided in the storage sub-system for controlling operation of the storage sub-system, and a management computer for managing configuration of the storage sub-system. The method comprises registering, by the host computer, a volume identifier, a physical address, and a group identifier of the storage sub-system in the disk management table in a disk control unit as a result of grouping of volumes in the storage sub-system according to a use purpose; storing, by the disk control unit, information on the volume identifier and the physical address of the storage sub-system acquired at system starting in the disk management table, obtaining from the disk management table a physical address of a volume belonging to a same group as a group input from the management computer, and notifying information described in a volume list of a volume allocated at the physical address to the management computer; and displaying, by the management computer, the information thus notified.

Independent claim 8 recites a storage system comprising a plurality of storage devices having one or more volumes; and a disk control unit connected to a host computer and a management computer configured to control the plurality of storage devices. The disk control unit further includes a disk management table for storing a volume identifier, a physical address, and a group identifier of a storage device as a result of grouping of volumes in the storage device according to a use purpose. The disk control unit obtains a physical

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address of a volume belonging to a same group as a group transmitted from the management computer, and notifies information described in a volume list of a volume allocated at the physical address to the management computer.

One of the benefits that may be derived is that it is possible to effectively acquire the storage device information such as information on the storage device use condition and information on the files stored without increasing the load on the host computer, and it is possible to acquire information for managing the large-scale storage system use condition without increasing the load on the host computer.

B.   Discussion of the References

1.   U.S. Patent No. 4,843,543

This reference relates to a storage control method and apparatus with a plurality of identifier transmission means for dividing the access requests issued from the plurality of access request control units into a plurality of groups based on the order of issuance from the access request control units. Each identifier transmission means is associated with one of the access request units and divides the access requests from the associated access request unit. Each identifier transmission means further adds access requests in each group with access request identifiers. See column 7, line 43 to column 8, line 27.

The reference is directed to handling access requests to storage areas. While the reference discloses adding access request identifiers to the access requests in each group and transmitting a number of access requests with access request identifiers to a number of access request deciders, it does not teach registering or storing in a disk management table a volume identifier, a physical address, and a group identifier of the storage device as a result of grouping of volumes in the storage device according to a use purpose; obtaining from the disk management table a physical address of a volume belonging to a same group as a group identifier input from the management computer; and notifying information described in a volume list of a volume allocated at the physical address to the management computer, as recited in independent claims 1, 2, and 8.

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2.   U.S. Patent No. 6,529,944 B1

This reference discloses a host system for remote control of mass storage volumes using cascading commands with a selected identifier being in the command as issued from the host system. The command is recognizable by each mass storage system in the stream of mass storage systems. The selected identifier is selected from a group of identifiers. The identifiers in the group identify the mass storage systems in the stream of mass storage systems.

The reference is directed to remote control of mass storage volumes using cascading commands that collect information about linked remote volumes. While the reference discloses asking the locally communicating mass storage system to return information which can be used to identify one or more levels of remote mass storage systems in a stream of remote mass storage systems, it does not teach registering or storing in a disk management table a volume identifier, a physical address, and a group identifier of the storage device as a result of grouping of volumes in the storage device according to a use purpose; obtaining from the disk management table a physical address of a volume belonging to a same group as a group identifier input from the management computer; and notifying information described in a volume list of a volume allocated at the physical address to the management computer, as recited in independent claims 1, 2, and 8.

3.   U.S. Patent No. 4,985,828

This reference discloses a method and apparatus for generating a real address, multiple virtual address spaces of a storage provides group identifiers in each of the entries in the address translation table, the address translation buffer and the entry in the address control register for identifying a respective area shared by a specific group of virtual spaces. See column 3, lines 16-66.

The reference is directed to a multiple virtual space control in a multiple virtual storage system having an address translation table used to translate a logical address to a real address. While it provides in the address translation table a group identifier having a plurality of bits for identifying an area common to a group of virtual spaces, it does not teach registering or storing in a disk management table a volume identifier, a physical address, and a group identifier of the storage device as a result of grouping of volumes in the storage

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device according to a use purpose; obtaining from the disk management table a physical address of a volume belonging to a same group as a group identifier input from the management computer; and notifying information described in a volume list of a volume allocated at the physical address to the management computer, as recited in independent claims 1, 2, and 8.

4.   Japanese Patent Publication No. JP 2002-132552

This reference relates to an information processing system capable of specifying not only data set name but also physical position, volume catalog only and volume name or data set as the units to set and release resident on a cache memory. In the system, a utility program 1 of resident control enables stay resident with issuing information of the physical position necessary to release resident to a disk array subsystem 13. For the specification of the volume catalog/volume name, the program 1 acquires physical information necessary to release resident from volume catalog information in a volume 14 in a disk-driving device 9. The program 1 acquires the physical position necessary to release resident by comparing resident control information 7 of dynamic cache resident mechanism with information of the volume catalog to delete spaces remaining on the cache memory.

According to this conventional technique, a cache memory provided in the disk control unit of the storage device stores a volume list and a catalogue file as file allocation information. Moreover, physical region data is resident in the cache memory and the resident state can be released. The volume list is stored in the cache memory, which is not accompanied by the I/O operation to/from the disk device of the storage device and accordingly, it becomes possible to acquire the volume list information with low overheads. Moreover, since the catalogue managing the entire system file information can be handled as a type of file, the technique can acquire the catalog information with low overheads like the volume list. See present application at page 1, line 21 to page 2, line 12.
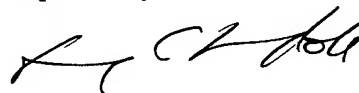
This conventional technique has no consideration on increase of the overheads required for information acquisition due to increase of the number of devices accompanying the increase of the computer system size. Since the volume list exists on a storage device basis, a problem arises that as the number of storage devices used increases, the overheads required for information acquisition increase. Especially in this conventional technique,

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information is acquired via a host computer and there may arise a problem of deteriorating the throughput or response time of work executed in the host computer. The catalog file also has a problem that increase of the overhead required for information acquisition accompanying the catalogue file size is expected as the system size increases. Moreover, as the system size increases, not only the catalog for managing the entire computer system is generated but also a great number of catalog files are generated according to the work and use purpose. The technique has a problem that such an increase of the number of catalog files also causes the increase of overheads required for information acquisition. See present application, at page 2, line 15 to page 3, line 12.

The reference does not teach registering or storing in a disk management table a volume identifier, a physical address, and a group identifier of the storage device as a result of grouping of volumes in the storage device according to a use purpose; obtaining from the disk management table a physical address of a volume belonging to a same group as a group identifier input from the management computer; and notifying information described in a volume list of a volume allocated at the physical address to the management computer, as recited in independent claims 1, 2, and 8.

(f)   In view of this petition, the Examiner is respectfully requested to issue a first Office Action at an early date.

Respectfully submitted,

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